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THE RETENTION OF ARSENIC BY ANIMAL CHARCOAL.

By John Marshall,
Professor of Chemistry and Toxicology, University of Pennsylvania.

AND

Leon A. Ryan,
Assistant Demonstrator of Chemistry, University of Pennsylvania.

At a recent meeting of the Philadelphia Section of the American Chemical Society, the inventor of a water filter in which animal charcoal is employed read a paper in which the statement was made that when aqueous solutions of the salts of some of the metals were passed through animal charcoal, the latter removed the metals from the solution, and that even arsenic in aqueous solution, as arsenious acid, could in large part be removed.

The retention in the mass of charcoal of those metals which form insoluble phosphates is what one would expect because of the formation of such phosphates by the soluble phosphates of the animal charcoal and their mechanical retention in the mass of charcoal, but this explanation would not apply to arsenic.

On passing distilled water through animal charcoal, we found that on adding plumbic acetate to a portion of the liquid that had been passed through, a copious precipitate of plumbic phosphate was produced; but on adding a solution of arsenious acid to another portion of the liquid, no evidence of any change whatever was observed.

The reader of the paper quoted some unpublished investigations on the retention of animal charcoal, made by Mr. Edward R. Noyes, under the direction of C. H. White, M.D., Medical Director U. S. N. (now retired), in the United States Naval Museum of Hygiene and

Medical School, Washington, D. C., in which Mr. Noyes found that a very considerable amount of arsenic had been retained by the animal charcoal. The matter was of such interest to us that we undertook the confirming of Mr. Noyes' observations. Our results, as detailed below, confirm Mr. Noyes' observations.

EXPERIMENT NO. I.

A quantity of animal charcoal weighing 789·4 grammes was dried at 110° C. to constant weight. The constant weight was 777·885 grammes, showing a loss of 11·515 grammes, or 1·458 per cent. in weight.

0·4455 gramme arsenious oxide was dissolved in 3,000 c.c. of distilled water and the solution was passed through the animal charcoal. The time required for the passage of the solution, *i. e.*, until liquid ceased to come from the charcoal, was three hours. Of the 3,000 c.c. of solution, 2,670 c.c. passed through, leaving 330 c.c. as the volume retained in the mass of charcoal.

Of the liquid which had passed through, 100 c.c. were taken, sulphurous acid added to reduce any arsenic acid which may have been produced, the sulphurous acid expelled by heat, the liquid strongly acidulated with hydrochloric acid and a slow stream of washed hydrogen sulphide conducted into the warmed liquid for several hours and then stood aside in a warm place over night. The arsenious sulphide was collected on a previously washed and dried filter, washed with boiled water, then with alcohol, with ether, and finally with carbon disulphide, and then dried and weighed.

Two determinations, using 100 c.c. of the liquid in each case, were made.

a yielded . . . . . 0·0069 gramme arsenious sulphide.
b " . . . . . 0·0063 " " "

The mean of the two determinations is 0·0066 gramme, which corresponds to 0·0053 gramme of arsenious oxide. Each 100 c.c. of the original solution of arsenious oxide before it was passed through the charcoal contained 0·01485 gramme arsenious oxide; therefore, the amount of arsenious oxide retained by the animal charcoal from each 100 c.c. was 0·00955 gramme, or 64·30 per cent. This is assuming that the 330 c.c. of liquid which remained in the animal charcoal as liquid held mechanically to saturate the mass of charcoal, contained proportionately the same percentage of arsenious

oxide that the liquid which had passed through contained; or if, finally, distilled water had been passed through the charcoal until the portion of the original arsenical liquid (330 c.c.) which remained to saturate the charcoal had been washed out, and the total quantity of liquid, including the washings, had been concentrated by evaporation and the arsenic determined therein, it is reasonable to believe that 64·30 per cent. of the arsenious oxide in the original solution would have been retained by the animal charcoal. Under this assumption each gramme of the previously dried animal charcoal retained 0·0006 gramme of arsenious oxide.

EXPERIMENT NO. 2.

A quantity of animal charcoal — undried — weighing 763·7 grammes was employed. 3·3972 grammes arsenious oxide was dissolved in 3,000 c.c. of water and the solution was passed through the animal charcoal. The time required for the passage of the solution was two hours. Of the 3,000 c.c. of solution, 2,630 c.c. passed through, leaving 370 c.c. in the mass of charcoal.

Three determinations of arsenic, using 100 c.c. of the liquid in each case, were made.

a yielded	0·0843	gramme	arsenious	sulphide.
b "	0·0863	"	"	"
c "	0·0868	"	"	"

The mean of the three determinations is 0·0858 gramme, which corresponds to 0·06905 gramme arsenious oxide. Each 100 c.c. of the original solution before it was passed through the charcoal contained 0·11324 gramme arsenious oxide; therefore, the amount of arsenious oxide retained by the animal charcoal from each 100 c.c. of solution was 0·04419 gramme or 39·02 per cent. The assumption stated in experiment No. 1 would also apply here. In this case each gramme of undried animal charcoal retained 0·00278 gramme of arsenious oxide.

THE QUANTITATIVE ESTIMATION OF STRYCHNINE.

By F. J. Smith.

Several methods have been proposed for the quantitative estimation of strychnine in mixtures of strychnine and brucine, principally in the form of impure alkaloids as extracted from tinctures and fluid extracts in the process of standardization.

The ferrocyanide method of Dunston and Short, as adopted by the British Pharmacopœia, is very tedious, and has been shown not to be particularly accurate, as the strychnine ferrocyanide is stated to carry down with it some of the brucine ferrocyanide, so that the results are too high.

Lyons's method of washing away the brucine by means of a saturated solution of strychnine in 40 per cent. alcohol is also stated by Gordin to be inaccurate.

He says that " most of the strychnine is washed away along with the brucine," and that the reason may be that, in the amorphous condition, strychnine must be more soluble in 40 per cent. alcohol than when in the crystalline form.

Keller's method of destroying the brucine by oxidation with HNO_3 and shaking out the strychnine with chloroform after making the solution alkaline, appears to give good results; but Gordin, working on a mixture of pure alkaloids, failed to get more than 96 per cent. strychnine by this method. In a series of experiments, conducted with the object of avoiding, if possible, this loss of 4 per cent., Gordin found that, by modifying Keller's method in certain particulars, much more accurate results were obtained. He reduced the time of digestion with HNO_3 from one hour and a half to ten minutes, finding this was quite long enough to effect the destruction of the brucine, and that the longer period of digestion resulted in the partial decomposition of the strychnine, as evinced by the yellow color of the solution, due to the formation of trinitrophenol.

He also found that a weaker acid could be used with better results, as by it the brucine was completely destroyed, whilst the strychnine was not affected.

By substituting a fixed alkali for ammonia, and pure chloroform for ether-chloroform, a much whiter alkaloid was obtained, and sufficiently pure to be weighed. The details of the improved method are as follows:

The mixed alkaloids, which may be the residue from 8 or 10 grammes of drug, are dissolved in 15 c.c. of 3 per cent. H_2SO_4 by the aid of a water-bath heat. The solution is cooled to ordinary temperature, and 3 c.c. of a previously prepared and cooled mixture of equal parts of strong HNO_3 (s. g. 1·42) and water are added to the alkaloidal solution.

The liquid is set aside for exactly ten minutes, shaking it gently

three or four times during this time. The red liquid is now transferred to a separator containing 25 c.c. of a 10 per cent. solution of sodium hydrate, and the vessel in which digestion of the alkaloids has taken place is washed three or four times with very small amounts of water.

Care must be taken that sufficient alkali is present to neutralize all the HNO_3 and leave the liquid alkaline. This is then shaken out with chloroform, using 20 c.c. for the first shaking, and 10 c.c. each for two subsequent shakings.

The chloroformic solution is now filtered through a small plain double filter, arranged so that there are four folds of paper on each side, into a tared flask, taking care to wash the filter and stem of the funnel with small amounts of chloroform, and to the colorless solution of strychnine thus obtained are added 2 or 3 c.c. pure amyl alcohol, which distills between 128° and 132° C. and leaves no residue on evaporation.

(This prevents decrepitation of strychnine, on removal of last traces of chloroform by heat.)

The chloroform is now distilled off completely, and the small amount of amyl alcohol left behind is removed by keeping the vessel on the water-bath and blowing air over the opening.

The vessel is now dried for about two hours at a temperature of 135° to 140° C., and when cold, weighed.

Gordin's figures show this method to give very accurate results, and its great advantage is, that it is very easily carried out and occupies but a short time.

I have not attempted to test the accuracy of the process by working on the pure alkaloids; but during the last six months have used it exclusively in assays of the drug and also of liquid and solid extracts. In every case the percentage of strychnine found has been within the limits of 40 to 45 per cent. of the total alkaloid.

Lyons states in his "Assay of Drugs" that the average is about 42 per cent.

A powdered extract of nux vomica yielded 20 per cent. impure alkaloids by weight.

This was dissolved in 20 c.c. $\frac{n}{2}$ H_2SO_4 (which is about equivalent to the prescribed 15 c.c. of 3 per cent. H_2SO_4), half of which was titrated with $\frac{n}{100}$ NaOH, using the factor 0·1815 (from the mean of

the atomic weights of strychnine and brucine), as the amount of alkaloid in milligrammes neutralized by 1·c.c. of the acid.

This gave total alkaloid as 19·9 per cent. pure. The remaining half I treated according to the above method, and the weight of the residue, which was perfectly white, gave the amount of strychnine as 7·96 per cent. The proportion of strychnine in the total alkaloid was, therefore, 40 per cent.

Naturally, having taken for a titration factor a figure based on 50 per cent. strychnine in total alkaloids, there will be a slight discrepancy here; but, as that is the figure generally taken, I have always used it.

The strong reserve percolate of a fluid extract was the next to be assayed.

This yielded impure alkaloids 2·3 per cent.

As before, one-half of this residue was titrated and yielded 1·96 per cent. pure total alkaloid.

The strychnine found was calculated to 0·88 per cent. This shows a proportion of 45 per cent. strychnine in total alkaloid. Next, some new drug was examined and was treated by Lyons's method, No. 360 in "Assay of Drugs."

The impure alkaloid from 10 grammes weighed 0·32 gramme = 3·2 per cent.

This was dissolved in 20 c.c. $\frac{n}{2}$ H_2SO_4 and half titrated as before. The result was, total pure alkaloid 2·9 per cent. The colorless strychnine obtained from the other half of this solution weighed 0·0635 gramme = 1·27 per cent. and 44 per cent. of the total alkaloid.

From 1 gramme of a solid extract of nux vomica an impure alkaloid was obtained which weighed 0·162 gramme = 16·2 per cent.

On titration this yielded 15·1 per cent. total pure alkaloid. Half of this solution was also used for estimation of strychnine, which weighed 0·0332 gramme = 6·64 per cent. and 44 per cent. of the total alkaloid.

This solid extract was made from the same drug previously mentioned, and it will be noticed that the proportion of strychnine obtained is in each case identical, which proves the reliability of the method. For convenience and comparison these results are tabulated below.

	Mixed Alkaloids by Titration.	Strychnine.	Proportion of Strychnine in Total Alkaloids.
	Per cent.	Per cent.	Per cent.
Powdered extract nux vomica	19·9	7·96	40
Soft extract nux vomica	15·1	6·64	44
Pow lered nux vomica seeds	2·9	1·27	44
Fluid extract nux vomica seeds	1·96	0·88	45

SIMPLE FORMS OF LABORATORY APPARATUS.

By Frank X. Moerk.

Of the laboratory apparatus used in chemical analysis, none is of greater importance than the hydrogen sulphide generator. The apparatus described in this paper is inexpensive in construction and use and will remain in action until the sulphuric acid is nearly neutralized.

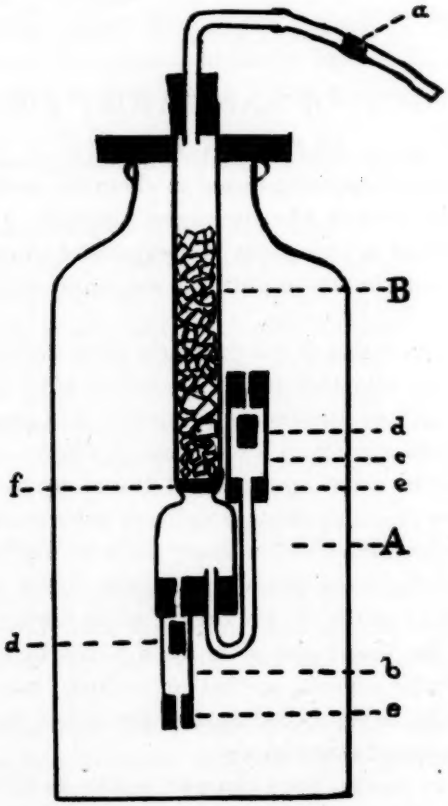
A is a gallon wide-mouth bottle nearly filled with dilute sulphuric acid, 10 per cent.; into this hangs a student lamp chimney *B* supported in the neck of the bottle by means of a paraffined wooden block; *B* contains a notched leaden disk *f*, which supports the ferrous sulphide to be acted upon and is closed by perforated rubber corks, the upper one supporting a delivery tube made up of a glass tube bent at right-angles and a short piece of rubber tubing containing the tightly fitting glass plug *a*; the lower one supporting two valves *b* and *c*, made of two sizes of glass tubing and perforated rubber corks, the lower one *e* in each valve being notched, the upper one perfectly smooth, so that an ordinary cork *d* may either close the valve by being forced against the upper cork or open the valve by being forced downward.

The apparatus, having been charged, works as follows: By pressing the rubber tubing at *a* to form a small channel alongside of the glass plug, the acid is allowed to enter the lamp chimney through the valve *c* and generate the gas, the valve *d* remaining closed; upon releasing the pressure at *a*, the generation of gas continues until the pressure of the accumulated gas forces the acid out of the chimney through the valve *d*, the upper valve remaining closed. Each time the generator is used fresh or the least saturated acid enters, this on being discharged sinking to the bottom of the bottle,

because of its greater gravity; so that it is obvious that greater activity with use of less acid is obtainable.

By using hydrochloric acid in the bottle and marble in the lamp chimney, the apparatus can be used for the generation of carbon dioxide.

An apparatus giving very good results in the estimation of car-

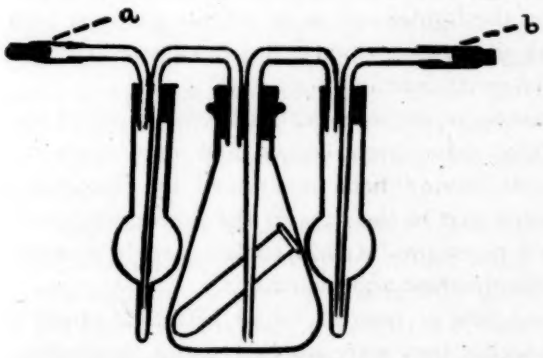


Apparatus for Generating Hydrogen Sulphide or Carbon Dioxide.

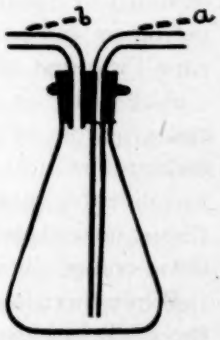
bonates can be easily constructed from 2-ounce Erlenmeyer flasks, small calcium chloride tubes (the smaller ends of which have been closed by fusion), rubber corks, 5 c.c. test-tubes and small glass tubing drawn out into capillary tubes below the corks (to decrease the weight of the apparatus and to reduce the size of the bubbles of gas or air in passing through sulphuric acid).

The calcium chloride tubes are filled to one-half the height of the bulb with concentrated sulphuric acid, and the open glass tubes closed with small glass plugs held in short sections of rubber tubing.

In use, the Erlenmeyer flask is disconnected, the test-tube removed and about 0·5 gramme of the carbonate to be determined weighed into the dry flask; sufficient water is then added to cover the lower end of the capillary tube; the test-tube is charged with about 4 c.c. strong hydrochloric acid and carefully lowered into the flask; the cork carrying the calcium chloride tubes is then placed in position, the apparatus wiped with a dry cloth and weighed. Remove the plug *a* and incline the apparatus so that a portion of the hydrochloric acid can escape from the test-tube and act upon the



Apparatus for the Estimation of Carbon Dioxide in Carbonates.



Air-drying Flask.

carbonate; after effervescence ceases, allow more acid to run in, etc., until finally all the acid has been added. The carbon dioxide and displaced air passing through the sulphuric acid in the calcium chloride tubes are thoroughly dried, so that no loss due to moisture is to be feared.

Remove plug *b* and connect with *b* of drying flask containing about 1 inch layer of sulphuric acid; in the same way connect *a* of the apparatus and *a* of a second drying flask; now apply suction by mouth at *b* end of this last drying flask and thoroughly remove all CO_2 from the apparatus (instead of direct suction, as just stated, it is much more convenient to attach an aspirator made from a 5-pint bottle and allow the outflowing water to slowly draw air through to the apparatus); disconnect the apparatus, replace plugs, wipe and

weigh. Connect and repeat the latter operations until constant weight is obtained; the difference between the original weight of the apparatus and that after reaction with the acid and displacement of the carbon dioxide is the weight of the liberated carbon dioxide.

The two drying flasks are necessary to protect the apparatus from increase in weight due to absorption of extraneous moisture.

THE PHARMACY OF LIQUID PETROLATUM.

By E. Fullerton Cook, P.D.

Liquid petrolatum, described in the United States Pharmacopœia as "a mixture of hydrocarbons, chiefly of the marsh-gas series, obtained by distilling off the lighter and more volatile portions from petroleum and purifying the residue when it has the desired consistence," was first officially recognized in 1890.

Although this substance is not identical with the more or less crude petroleum oils that have been known and used since the earliest historical periods, having been mentioned by Herodotus, and probably played some part in the rites of the fire-worshipers in Persia, nevertheless, this purer product has, to-day, largely replaced those cruder oils in both medicine and pharmacy.

While there is a broad field of interest for an historical study of the medicinal uses to which they were applied under the various names of Oil of Baku, Mecca Oil, St. Quirinu's Oil, Oil of Modena or Seneca Oil (see *Pharmaceutical Journal*, 1897), yet this paper has been limited to the practical part it takes in present-day pharmacy.

There are at least four distinct fields into which it has entered that will be spoken of in turn: they are, first, the administration of the oil internally as a nutrient in wasting diseases; secondly, as a soothing application to inflamed mucous membrane; thirdly, as a part base for ointments, and lastly, as the carrier, when dissolved in ammonium oleate, of various active medicaments which are to be applied externally. This form of liquid petrolatum has been known under the trade names of Vasogen and Valsol, and also as oxygenated petrolatum and petrox. Mr. M. I. Wilbert, in a paper which appeared in the American Journal of Pharmacy (1901, p. 220), has thoroughly canvassed the pharmacy of this preparation, and also its medical uses, and you will be referred to that article for any further details.

Taking up the first of these uses, we naturally turn to the emulsion as the best form for its administration, and a review of journals, for a number of years past, has shown that, although several formulas have been published,[1] a wide divergence of opinion has existed, for they are variously directed to be prepared from petroleum, petrolatum, white vaseline or soft paraffin, and with a difference of from 12½ per cent. to 33 per cent. of oil. The majority, however, have favored 25 per cent. of the liquid petrolatum, and the formulas offered are based upon that strength.

A number of initial experiments were made to determine the best emulsifying agent and preservative, and the results are here presented in some detail.

Acacia first being tried, it was found that the proportions usually suggested for the Continental method, 4 parts of oil, 2 parts of water and 1 part of acacia, would not produce an emulsion; but further experiments showed that if equal parts of water and liquid petrolatum and ¼ part, or better, ½ part of acacia be taken, an emulsion could be formed quickly and easily by the Continental method.

I may say here that this formula, for either stability or ease of manipulation, has not been improved upon by subsequent experiments, although it was found necessary to add a preservative.

To determine this point, a number of trials were made of the several available preservatives, and the preparations, after standing about eight months, show that either 8 per cent. of glycerin, 5 per cent. of alcohol, sodium benzoate (8 grains to 1 pint), benzoic acid (8 grains to 1 pint), oil of wintergreen (32 minims to 1 pint), or a mixture of oil of wintergreen with other oils like oil of sassafras and oil of bitter almond, will prevent decomposition.

As the result of these experiments, the two following formulas have given the most satisfaction and can be recommended:

EMULSION OF LIQUID PETROLATUM (PLAIN).

Liquid petrolatum,	℥iv
Acacia, powdered,	℥ij
Oil of wintergreen,	minims xxxij
Water, sufficient to make	Oi.

[1] *Merck's Rep.*, 1895, p. 29; *Chem. and Drug.*, No. 887, p. 611; *West. Drug.*, 1902, p. 392; *Meyer Bros.' Drug.*, 1900, p. 267.

Mix the liquid petrolatum with the powdered acacia in a dry mortar, add 4 fluidounces of water all at once, and triturate the mixture until a perfect emulsion is formed; then add the oil of wintergreen and finally enough water to make the finished product measure 1 pint.

EMULSION OF LIQUID PETROLATUM, WITH HYPOPHOSPHITES.

Liquid petrolatum,	℥iv
Acacia, powdered,	℥ij
Calcium hypophosphite,	grs. 330
Potassium hypophosphite,	grs. 110
Sodium hypophosphite,	grs. 110
Oil of wintergreen,	minims xxxij
Water, sufficient to make	Oi.

Mix the liquid petrolatum with the powdered acacia in a dry mortar, add 4 fluidounces of water all at once, and triturate the mixture until a perfect emulsion is formed; then add the oil of wintergreen. Dissolve the hypophosphites in 6 fluidounces of water and add this solution to the emulsion, finally adding enough water to make the finished product measure 1 pint.

The addition of vegetable oils, like olive oil or oil of sweet almond, for the purpose of increasing the stability of the emulsion, was not found necessary, although a number of samples were made varying the proportion of oil.

Other emulsifying agents were also tried, as a mixture of equal parts of tragacanth and acacia, tragacanth alone, glycerite of the yolk of egg, casein, mucilage of Irish moss and mucilage of dextrin, N. F.

A mixture of tragacanth and acacia, using the proportions suggested for acacia alone, produced, by the Continental method, a very satisfactory emulsion. Tragacanth alone forms a perfect emulsion, but the preparation is viscid and has no advantage over acacia.

The glyconin makes a good-looking preparation, but it must be prepared by the English method, which is much more tedious than the Continental. Casein, when made soluble by the addition of one-third of its weight of sodium bicarbonate, also forms an emulsion, but it has not remained permanent, while neither the mucilage of Irish moss nor the mucilage of dextrin would, when used alone, emulsify the liquid petrolatum.

The conclusion with regard to emulsions has been, therefore, that

when ease of manipulation and the quality and stability of the preparation are considered, the formulas already proposed, with acacia as the emulsifying agent, are superior to any others which have been offered.

Although without the strict province of this paper, some statements which relate to the therapeutic value of this substance should be cited; the difference of opinion among physicians, however, does not alter the fact that as pharmacists we should stand ready to dispense what the physician orders.

In the *Practical Druggist* (1899, p. 17), Dr. Limerick says that clinical experiments show that liquid petrolatum, used internally, possesses no therapeutic value as a nutriment in wasting diseases, such as in tuberculosis, when it is recommended as a substitute for cod liver oil. The text-books attach no importance to its use excepting for its bland, lubricating properties. The claim that it possesses antiseptic properties is also disproven, since various bacteria may be cultivated in petroleum. He states, however, that, administered internally, it does produce slight diuretic and diaphoretic effects. In the same journal (1899, p. 84), Dr. Robert Hutchinson reports upon a series of experiments undertaken to determine the nutritive value of petroleum emulsions. He says: "The question has long been a mooted one, and the class of chemical substances to which petroleum belongs, offering, as it does, persistent opposition to chemical action (which his experiments have confirmed), has been the basis for these suspicions."

He was convinced that "petrolatum is of absolutely no use at all as a substitute for cod liver oil, but that the crude petrolatum might possess some value, due to the volatile substances contained in it, entering the blood and being excreted by the mucous membrane. The purer the petrolatum, however, the less active will it be therapeutically."

However, as a nasal spray or the carrier of medicinal substances for application to inflamed mucous membrane, liquid petrolatum possesses those qualities which admirably adapt it to such a use. Being of itself non-irritating, and on the contrary soothing and acting as a protective, besides being odorless, it possesses all of those qualities needed for such medications.

Several years ago Dr. Alpers (AMER. JOUR. PHARM., 1901, p. 117) proposed the use of liquid petrolatum as a substitute for the oil of

sweet almonds in cold cream. It was thought at the time that this preparation, beautiful in appearance, easily made and apparently keeping indefinitely, would replace the long-tried official cold cream, but it has been shown that its use is limited. The well-known cooling effect of a cold cream when applied to a chafed or sunburnt skin will not follow if the preparation be made with liquid petrolatum. However, for theatrical trade, the removal of face-paints, etc., it has a well-deserved popularity and may there be used to advantage at least for cheapness.

COMMERCIAL ALOES.

By Martin I. Wilbert,
Apothecary at the German Hospital, Philadelphia, Pa.

(*Concluded from p. 214.*)

CHEMISTRY OF ALOES.

For many years it was thought that the active constituent of aloes was aloin. This principle, differing as it did in physiologic activity, as well as chemical properties, was usually named according to the aloes from which it was derived. Thus we had: barb-aloin from Barbadoes aloes; soc-aloin from Socotrine aloes; zan-aloin from Zanzibar aloes, and nat-aloin from Natal aloes.

Cape aloes, it was supposed, did not contain aloin, but a closely analogous body to which its cathartic action was attributed.

In addition to aloin, the various kinds of aloes were usually credited with containing a small quantity of volatile oil, and about 60 per cent. of a resinous material.

It has been known for some time that aloin was rather a complex compound, and that when distilled with zinc dust it yielded anthracene.[38] It is to the researches of Tschirch, Pedersen, Oesterle, Leger, Aweng and others that we are indebted for the more modern views on the chemistry of aloes.

E. Leger has demonstrated that not only does Cape aloes contain a crystallizable aloin, but that this aloin is isomeric with the physiologically active portion of the aloin found in Barbadoes, Curaçao or Socotrine aloes. He also states that the aloin from Barbadoes or Curaçao aloes, for instance, consists of two distinct bases; one, barb-aloin, is capable of being decomposed into aloemodin, and is chemically the same as the aloin found in Cape aloes.

The other body, which he names iso-barb-aloin, is not decomposed into emodin, but is readily oxidized, giving several distinctive color reactions, notably the deep red color with nitric acid, and the so-called Klunge's reaction for Barbadoes aloes, which, according to Leger's investigations is really a test for iso-barb-aloin.

It appears from Leger's investigations that barb-aloin is not readily separated from its contaminating iso-barb-aloin by any known methods of procedure.

According to Leger, the various aloes on the market have approximately the following composition: Barbadoes aloes, 5 per cent. of aloin, traces of iso-barb-aloin; Curaçao aloes, 10 per cent. aloin, one-half iso-barb-aloin; Cape aloes, 5 per cent. aloin, no iso-barb-aloin; Socotrine aloes, 4 per cent. aloin, very little iso-barb-aloin; Jafferabad aloes, 20 per cent. aloin, mostly iso-barb-aloin. Tschirch and his assistants were probably the first to demonstrate the similarity between the cathartic principle of aloes and that of such drugs as senna, frangula, etc.[40]

Oesterle[41] in 1900 demonstrated that the emodins of aloes and frangula were isomeric, both having the chemical formula of $C_{15}H_{10}O_5$ corresponding to trioxymethyl anthraquinone.

Aweng[42] has followed up the work of Oesterle and reports that he has been able to isolate from the water-soluble portion of barb-aloin a glucoside having the reaction of oxyanthraquinone, and being in all respects analogous to the double glucoside he found in frangula and cascara.

By boiling with hydrochloric acid he obtained as a decomposition product a compound analogous to the pseudoemodin he had previously obtained from frangula.

Leger[43] has more recently taken up the study of decomposition and addition products to be obtained from barb-aloin and iso-barb-aloin, particularly their behavior to sodium dioxide. From the published reports it would appear that iso-barb-aloin gives oxidation products closely related if not identical with those obtained from barb-aloin.

Pedersen[45] has investigated into, and has reported on, the chemical composition of the resinous portion of the different varieties of aloes. He finds that the resins of Natal and Cape aloes are composed largely of a resinotannal ester of paracumaric acid. In the case of Barbadoes and Curaçao aloes this resinous portion is a resi-

notannalester of cinnamic acid. This same subject has also been reported on by Professor Tschirch in a more recent article.

CHEMICAL TESTS.

These modern developments in the chemical composition of aloes give us some more definite knowledge of the applicability and uses of the various tests for aloes.

It has been known for a long time that not any of these different tests were applicable to all varieties of aloes.[46] While considerable work must still be done, before we are assured of reliable quantitative tests for the various chemical constituents or products of aloes, we have at the present time several fairly reliable qualitative tests.

According to Tschirch,[47] the well-known test for Barbadoes aloes, deep red color on the addition of a small fragment of aloes to strong nitric acid, is really a test for iso-barb-aloin, and that the resulting aloin red is a characteristic oxidation product of the iso-barb-aloin. Klunge's reaction[48] is another reliable and readily applied color-test for iso-barb-aloin; it is rather a sensitive one and is applied as follows:

"Dilute a freshly prepared aqueous solution of aloes, or aloin, until it is nearly colorless, then add one drop of a 10 per cent. solution of cupric sulphate; the solution becomes intensely yellow. On the further addition of a few drops of solution of sodium chloride or potassium bromide and a few cubic centimeters of alcohol, or, in lieu of the alcohol, on boiling the mixture, a deep red color indicates presence of iso-barb-aloin."

For the physiologically active portion of aloes we have an efficient, reliable and comparatively sensitive test in the well-known Borntraeger's test for emodin.[49] This is usually directed to be applied as follows:

"A solution of aloes or aloin is shaken with an equal quantity of petroleum benzine, and the mixture allowed to stand; when it has separated into two distinct layers, a portion of the supernatant clear benzine solution is decanted into a test tube and one drop of stronger solution of ammonia is added, well shaken, and the mixture again allowed to stand; on separating, it will be found that the ammonia has assumed a deep rose-red color if emodin is present."

A modification of this test, using stronger ether for the petroleum benzine, will usually be found to work more rapidly and to give equally as reliable results.

There are quite a number of reactions that are characteristic of Natal aloes; but as this variety of aloes is not commercially available, it will not be necessary to do more than mention the one usually considered to be the most reliable. This is given by the United States Pharmacopœia practically as follows: A fragment of the suspected aloes is mixed with sulphuric acid; on blowing the fumes of nitric acid across the surface of the mixture, the development of a blue color indicates presence of Natal aloes.

ADULTERATIONS AND SOPHISTICATIONS.

Aloes, it appears, has been subject to adulterations and sophistications from the very earliest time.

Pliny, in his "Natural History," book 27, chapter 5, says: "Aloes when it is hard and black should be rejected; the same, too, when it is mixed with gum and acacia, a fraud which may be easily detected by the taste." Pliny also refers to a mineral aloe (probably a form of bitumen); this he considers inferior to true aloes. It will be seen from this reference that even in the days of Pliny aloes was not alone adulterated, but a foreign substance was at times even substituted for it.

Socotrine aloes, even down to our own time, is often adulterated. This subject, the adulteration of Socotrine aloes, was one to which the late Dr. Squibb had paid particular attention. Much of our knowledge on the subject is directly due to his work and observations. Attention had, of course, been repeatedly called to the gross adulteration of this variety of aloes by other writers.[50] None of them, however, ever demonstrated the fact as clearly as Dr. Squibb. At the present time, with the single exception of some of the aloes sold as Socotrine, very little or no foreign materials are found in the aloes of commerce.

As noted in the introduction to this essay, there appears to be no hesitation, however, to substitute one variety of aloes for another. This substitution appears to be more frequently practiced with the powdered drug. This fact is of particular importance on account of the widespread preference for powdered aloes; fully 90 per cent. of the aloes sold to retail pharmacists being powdered.

From a comparative study of a number of samples obtained from both wholesale and retail druggists in different parts of the United States it would appear that much of the aloes sold in this country at the present time is not true to name.

From what has been said of Barbadoes aloes it will be seen that probably none of the aloes sold in this country, at the present time, comes from the island of Barbadoes, practically all of it being from the Dutch West Indies, so-called Curaçao aloes, which, when sold as Barbadoes aloes, usually brings two or even three times its regular price.

A considerable amount of what is offered in this country as Cape or even Socotrine aloes appears to be nothing but a better quality of Curaçao aloes. As noted under "Curaçao aloes," a large proportion of this variety is now being prepared to simulate Cape aloes in physical appearances. Capey Curaçao can, however, readily be told from true Cape aloes by the total absence of any greenish tint and by the fact that it readily gives a deep red color with strong nitric acid, or with Klunge's test, showing the presence of iso-barb-aloin. One other fraud that is said to be practiced quite extensively in Europe is the selling of aloe resin, from which the aloin has been removed, as Cape aloes.[52] This may usually be detected by its comparative insolubility in acidulated water and by tests for iso-barb-aloin, it being extremely difficult to remove all the aloin from the resinous material.

The following table will give a fair idea of the quality and variety of aloes sold in this country at the present time. It may be well to add that, with the exception of the Natal aloes, all the samples responded to Borntraeger's test.

SUMMARY OF TABLE No. 1.

Name.	Number Examined.	Containing Barb-aloin.	Aloes Containing Iso-barb-aloin.
Socotrine	26	20	6
Cape	24	19	5
Barbadoes	18	1	17
Curaçao	11	0	11

The samples enumerated in Table No. 1 represent only samples obtained from wholesale houses and drug brokers in different parts of the United States. Samples obtained from retail stores, and museum specimens that were used for control or comparison, were not tabulated.

In addition to the samples enumerated above, the following

specimens, obtained through reputable houses, illustrate the variety and kinds of aloes available at the present time:

Labelled.	Appearances.	Color of Powder.	Reaction with Nitric Acid.
Socotrine	Soft, brown glossy surface	Greenish brown	Greenish yellow
Socotrine	Reddish brown	Light yellow	Yellow
Socotrine	Dark brown, glossy	Reddish yellow	Dark yellow
Barbadoes	Dark brown, dull opaque	Yellow	Red
Hepatic	Dark brown, opaque	Reddish yellow	Red
Curaçao	Dark brown, glossy	Reddish yellow	Red
Curaçao	Brown, opaque	Reddish yellow	Red
Curaçao	Dark brown, opaque	Reddish yellow	Red
Cape	Black, glossy	Greenish yellow	Olive to brown
Cape (Capey Curaçao)	Dark brown, glossy	Reddish yellow	Red
Cape	Black, glossy	Greenish yellow	Greenish yellow to brown
Uganda	Reddish brown	Yellow	Yellow to brown

The test with nitric acid was made by taking 5 c.c. of strong nitric acid in a porcelain evaporating dish and sprinkling over the top of this 0.05 of the finely powdered aloes. This was considered to be a more satisfactory way of demonstrating the resulting color than the method recommended by the German Pharmacopœia of pouring a quantity of nitric acid over a splinter of aloes.

Very little or no difference was noted in the results of Klunge's test and the nitric acid test for iso-barb-aloin. The former is probably more sensitive, while the latter is more easily applied.

UNITED STATES TRADE IN ALOES.

There is little reliable data as to the amount of aloes annually produced or used. Some idea of the money values may be had from a perusal of the London drug market reports, but even these are not reliable on account of the constant changes that are taking place in the direction of trade.

Cape Aloes, for instance—this in former years was sold exclusively in the London market, but is now largely shipped to Hamburg;[53] much, if not the greater portion, of true Cape aloes being used in Germany.

The same holds true of the Curaçao or West Indian variety. This, according to a letter from Gehe & Co., is now largely sold through

the New York market. This latter statement would also appear to be borne out by the report of imports into the United States.

According to the National Dispensatory,[54] the amount of aloes imported into the United States in 1876 was 96,500 pounds; this had increased in 1882 to 230,624 pounds. The figures for the past five years, given in the annexed table, are copied from the annual reports of the United States Treasury Department.[37]

IMPORTS FOR CONSUMPTION; YEARS ENDING JUNE 30th,

	1898	1899	1900	1901	1902
Quantities in pounds	640,658	664,613	472,976	841,130	492,968
Values	$20,734.00	$21,253.00	$17,337.00	$29,048.00	$18,726.00
Value per unit of quantity	0.03.2	0.03.2	0.03.6	0.03.5	0.03.8

Apart from the large quantities given in this report, the comparatively low value per unit of quantity is perhaps the most interesting part of the figures here quoted. These figures are even more interesting when compared with the current prices quoted for the different grades of aloes.

The style of package in which the different varieties of aloes are found on the market may be of interest.

Cape aloes comes in cases holding approximately 500 pounds.

Curaçao aloes comes in cases of about 100 pounds.

Curaçao aloes, in gourds, usually appears in two styles of package.

Small gourds, from 2 to 10 pounds each, are packed in boxes holding about 75 pounds each.

Large gourds, weighing from 11 to 15 pounds each, are packed in barrels holding about 200 pounds each.

The so-called Socotrine aloes usually comes either in kegs holding about 100 pounds, or in tin-lined claret cases holding variable quantities. Zanzibar aloes, usually sold as Socotrine, comes in monkey-skin packages, varying in weight from 10 to 30 pounds.

Some of the Zanzibar aloes, particularly that sold by way of Bombay, is also packed in kegs holding about 112 pounds.

Uganda aloes, according to Holmes, comes in bags holding about 4 pounds of the finely powdered or coarsely ground drug, each bag having a crown, as trade-mark, stamped upon it; or it comes in cakes of about 4 pounds each, with a crown stamped in the drug.

Jafferabad aloes, as stated above, does not appear in the American

markets, and none of the available price-lists of foreign drug houses give any description of the size of the package.

CONCLUSIONS.

From what has been said it would appear that the different varieties of aloes on the market at the present time may be divided into two classes or groups: one containing barb-aloin with little or no iso-barb-aloin, and the other containing considerable quantities of iso-barb-aloin in addition to the barb-aloin.

Sufficient aloes of good quality is available at the present time to warrant the introduction of restrictions as to purity and water content, that would do away with retaining in our Pharmacopœia the title and formula for "Aloe Purificata."

With continued research into the chemistry of aloes it is also quite probable that the immediate future will give us a modified aloin, or an analogous compound that will more nearly represent the active cathartic principle of aloes than does the aloin available at the present time.

The general use of powdered aloes would facilitate testing for impurities and guarantee a product fairly even as to water content.

As an outline for a pharmacopœial heading for aloes the following may be suggested:

ALOE-ALOES.

The inspissated juice of different species of aloe grown in tropical or sub-tropical climates.

Aloes varies from reddish brown to deep black in color and may have a glossy or opaque surface, according to the mode of preparation.

Powdered aloes may vary from light yellow to brown or greenish brown in color. Aloes should not contain more than 10 per cent. of water, and leave on incineration not more than 3·5 per cent. of ash. It should be almost entirely soluble in 50 per cent. alcohol, U.S.P. acetic acid or a 1 per cent. solution of ammonium hydrate.

Aloes should react to Borntraeger's test for emodin. On mixing a small quantity of aloes with strong sulphuric acid and blowing the fumes of nitric acid over the surface of the mixture, it should not assume a blue color—absence of Natal aloes.

Aloes may be divided into two general groups or classes:

Aloes A—containing barb-aloin; responds to Borntraeger's test for emodin, but does not give a distinct red color with nitric acid, or with Klunge's test.

Aloes B—contains iso-barb-aloin with barb-aloin; responds to Borntraeger's test for emodin, and also gives a deep red color with strong nitric acid or with Klunge's test.

REFERENCES.

[1] Universal Pharmacopœia. Dr. Bruno Hirsch. Göttingen, 1902.

[2] Pharmacographia. A. History of Drugs. Second edition. Flückiger and Hanbury. London, 1879.

[3] Die Heilpflanzen. Dr. Georg Dragendorf. Stuttgart, 1898.

[4] Beiträge zur Kenntniss der Aloe. Carl Treumann. Dorpat, 1880.

[5] Pharmacognosie des Pflanzenreichs. Dr. F. A. Flückiger. Berlin, 1891.

[6] The Elements of Materia Medica. Fourth edition. Jonathan Pereira. London, 1854.

[7] John Uri Lloyd. *Western Druggist*, 1898, p. 338.

[8] American Dispensatory. Dr. Redmond Cox. Philadelphia, 1806.

[9] The Dispensatory of the United States of America. Fifth edition. Wood and Bache. Philadelphia, 1843.

[10] Dr. E. R. Squibb. Proceedings of American Pharmaceutical Asso., 1863.

[11] Organic Materia Medica. John M. Maisch. Philadelphia, 1882.

[12] The Dispensatory of the United States. Fifteenth edition. Philadelphia, 1884.

[13] J. Medley Wood. *Phar. Jour. and Trans.*, 1890, p. 495. Reprinted, AMERICAN JOURNAL OF PHARMACY, 1891, p. 33.

[14] Pharmacopœia of the United States. Philadelphia, 1893.

[15] The British Pharmacopœia. London, 1898.

[16] Die Natürlichen Pflanzenfamilien. Engler and Prantl. (Liliaceæ), 1887.

[17] E. M. Holmes. From *Phar. Jour. and Trans.* Reprinted, AMERICAN JOURNAL OF PHARMACY, 1890, p. 508.

[18] A. Tschirch. *Schweizerische Wochenschrift f. Chem. u. Pharmacie*, 1902, p. 257.

[19] E. M. Holmes. Reprinted, AMERICAN JOURNAL OF PHARMACY, 1891, p. 355.

[20] Kommentar zur Pharmacopœia Germanica. Dr. H. Hager. Berlin, 1883.

[21] An Ephemeris of Materia Medica, Pharmacy and Therapeutics. E. R. Squibb & Sons. Volume II, p. 661.

[22] A. R. L. Dohme. *Druggists' Circular*, 1897, p. 126.

[23] *Chemist and Druggist* (editorial), 1884, p. 114.

[24] Arzneibuch für das Deutsche Reich. Vierte Ausgabe. Berlin, 1900.

[25] Commentar zum Arzneibuch für das Deutsche Reich. Schneider und Süss. Göttingen, 1902.

[26] Handelsberichte. Gehe & Co. Dresden, 1899, p. 7.

[27] The American Gazetteer. Boston, 1804.

[28] History of Barbadoes. Sir H. Shomburgk. 1847, p. 149.

[30] Mr. W. G. Freeman. *Chemist and Druggist*, 1902, Vol. 61.

[31] A. Faber. *Pharmaceutical Journal*, 1848, p. 548.

[32] Aloes in Curaçao. From *Chemist and Druggist.* Reprinted, AMERICAN JOURNAL OF PHARMACY, 1890, p. 505.

[33] Mr. E. Robiquet. Reprinted, AMERICAN JOURNAL OF PHARMACY, 1856, p. 543.

[34] Dr. Georg Weigel. *Pharmaceutische Centralhalle*, 1902, p. 431.

[35] Report of British Pharmaceutical Conference. AMERICAN JOURNAL OF PHARMACY, 1892, p. 543.

[36] E. M. Holmes. From *Phar. Jour. and Trans.* Reprinted, AMERICAN JOURNAL OF PHARMACY, 1881, p. 175.

[37] J. Medley Wood. From Kew Bulletin. Reprinted, AMERICAN JOURNAL OF PHARMACY, 1891, p. 33.

[38] Pharmaceutical and Medical Chemistry. Sadtler and Trimble. Philadelphia, 1895.

[39] E. Leger. From *Jour. de Pharm. et de Chem.*, 1901. Reprinted, *Druggists' Circular*, 1901, p. 190.

[40] G. Pedersen und A. Tschirch. *Archiv der Pharmacie*, 1898, p. 200.

[41] O. A. Oesterle. *Schweiz. Wochs. f. Chemie u. Pharmacie*, 1900, p. 45.

[42] Dr. E. Aweng. *Apotheker Zeitung*, 1902, p. 442.

[43] E. Leger. *Journal de Pharmacie et de Chemie*, 1902, p. 519.

[44] E. Leger. *Journal de Pharmacie et de Chemie*, 1902, p. 592.

[45] G. Pedersen. *Archiv der Pharmacie*, 1897, p. 200.

[46] Karl Heuberger. *Schweiz. Wochs. f. Chem. u. Pharm.*, 1899, p. 506.

[47] A. Tschirch. *Chemiker Zeitung*, 1901, p. 892.

[48] A. Klunge. *Schweiz. Wochs. f. Chemie u. Pharmacie*, 1882, p. 463.

[49] Hugo Borntraeger. *Schweiz. Wochs. f. Chem. u. Phar.*, 1880, p. 156.

[50] Pliny's Natural History, Vol. V. Bohn's Libraries, London.

[51] Adulterations of Various Substances Used in Medicine and the Arts. Lewis C. Beck, M.D. New York, 1846.

[52] *Apotheker Zeitung*, 1896, p. 216.

[53] Handelsberichte. Gehe & Co., Dresden, 1902.

[54] National Dispensatory. Stillé and Maisch. Philadelphia, 1893.

[55] Imports for Consumption. Bureau of Statistics, Treasury Department, Washington, D. C.

[56] E. M. Holmes. *Pharmaceutical Journal*, 1899, p. 230.

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THE EXTERNAL PREPARATIONS AND THEIR THERAPY.[1]

By Carl S. N. Hallberg, Ph.G.,
Professor of Pharmacy in the School of Pharmacy, University of Illinois; Member Committee of Revision U. S. Pharmacopœia.

While the history of the preparations embraced in the broad generalization of external preparations is of the most ancient origin, yet their evolution and differentiation along therapeutic lines is largely a matter of recent development.

Up to a comparatively recent period the fats employed for vehicles of the oleaginous preparations were selected with sole reference to their pharmaceutic properties, that is to afford preparations possessing the most desirable physical characteristics: proper consistence, ready fusibility, etc. The earlier materia medica was especially rich in oils and fats of animal origin, the fat of nearly every creature being vaunted as having especial virtues, such notions still surviving among many peoples, as, for example, bear-grease to promote the growth of the hair; goose-grease to loosen and break up a cold; rattlesnake oil as an application for rheumatism, and many similar domestic remedies.

OINTMENT VEHICLES.

The introduction of the petroleum fats or soft paraffins, in 1870—cosmolin and vaselin—was a great advance over the rancid and otherwise often decomposed mixtures of animal and vegetable fats, mostly used before this time, and the substitution of these practically inodorous and unchangeable soft paraffins for the latter became quite general. The immiscibility with water and watery liquids of the soft paraffins was the only drawback to their more extended use, until about 1882 the purified wool-fat appeared under the name of lanolin. The peculiar property of this cholesterin, even after being hydrated, to take up its own weight of water, at once attracted attention, and when its power to penetrate the skin was subsequently discovered it began, though slowly, to be recognized as a valuable medium by which systemic effects may be obtained through the skin. While the fat from wool was used by the ancients under the

[1] Read at the fifty-third annual meeting of the American Medical Association, in the Section on Materia Medica, Pharmacy and Therapeutics, and reprinted from the *Jour. Amer. Med. Assoc.*, 1903, p. 958.

name of "Œsypus," to Oscar Liebreich is due the credit of presenting a pure hydrated form of it under the name of lanolin, official as adeps lanæ hydrosus, U. S.

THERAPEUTIC GROUPING.

The at first more or less empiric use of these two fats—the soft paraffin and lanolin—of exactly opposite qualities as regards their water miscibility and property to penetrate the skin, led eventually to the grouping of the ointments and similar preparations from a therapeutic standpoint, according to the vehicle employed, substantially as follows:

(1) *Epidermatic:* Non-penetrative, or non-absorptive. Protective, antiseptic. Vehicle: Soft paraffin, vaselin or petrolatum, U. S.

(2) *Endermatic:* Semi-penetrative or semi-absorptive. Emollient, nutritive, astringent, etc. Vehicle: Animal or vegetable fats, oils and waxes. Lard, suet, oils of almond, olive, etc.

(3) *Diadermatic:* Penetrative or absorptive. Systemic or constitutional. Vehicle: Lanolin or hydrated wool-fat.

While this classification is a generalization, its approximate correctness is apparent from the fact that a vehicle consisting of equal parts of petrolatum and lanolin, the respective types of the two extreme groups, has the general properties of the intermediate endermatic group. Since this vehicle does not become rancid or react with chemicals, as do the animal or vegetable fats and oils, it serves excellently for endermatic uses.

SUPPOSITORIES.

In no class of preparations has the failure to consider the general therapeusis been so apparent as in the suppositories. Since their first introduction into the U. S. Pharmacopœia in 1870, the vehicle has been uniformly cacao-fat or theobroma oil.

While three different forms of suppositories are recognized, no distinction is made as to the vehicle employed, although the necessity for such selection is generally conceded. For rectal suppositories fats undoubtedly are the best vehicle, not only because of the alkalinity of the secretions, but also because more or less penetrative or absorptive effects are desired. Cacao-fat serves this purpose probably better than any other fat. While soap is sometimes used, its effects are simply those of an irritant or solvent, as in the official

glycerin suppositories. Neither is gelatin a proper vehicle for rectal suppositories, except when used instead of nutritive enemata, where other considerations supervene.

On the other hand, the secretions of the urethra and vagina are normally acid, and fats are therefore not indicated as the proper vehicle for urethral and vaginal suppositories, but water-soluble substances should be employed. Glycero-gelatin answers the purpose probably better than most of the other substances employed, the only objection being that in melting it exudes and may mat the pubic hairs. By using 50 per cent. anhydrous glycero-gelatin mass, a soft readily soluble "bougie" is obtained, in which tannin and similar agents may be presented without difficulty.[1]

The late Dr. Hay, of Chicago, employed a vaginal suppository of elm powder which had the advantage of ready preparation in that the suppository could be easily formed into any shape desired with the fingers.

Glycero-Massa Ulmi (*Elm Suppository Mass*).—Powdered elm bark, 10; water, 6; glycerin, 6 c.c. In the water and glycerin previously mixed dissolve the required amount of the medicinal agent, add the solution to the elm powder at once and quickly mix and form a mass by working the mixture in a mortar. A soft, cohesive and plastic mass results, which may be rolled out, divided into the required number of parts (for the above quantity of 6) and made globular by forming with the spatula and the fingers. This operation should be done quickly, since the mass hardens in about ten minutes and can not then be readily formed. Any form can easily be made in this manner without losing its shape. In about twenty-four hours the suppositories become hard and elastic.

In a suppository the medicinal agent should be most thoroughly distributed with the vehicle, as in all similar preparations, and it is the worst kind of slip-shod pharmacy to use the so-called "hollow" suppositories.

CERATES.

The cerates are mixtures of fats and waxes, having a higher melting point than ointments, their firmer consistence requiring

[1] While tannin and derivative extractives, krameria, etc., form a translucent mass with absolutely water-free glycero-gelatin, such mass is as insoluble in water or watery secretions as in leather, and therefore therapeutically worthless.—C. S. N. H.

them usually to be spread on cloth and applied as dressing. They are, therefore, in the epidermatic group and comprise protective, cooling, emollient and vesicating effects. The cantharidal cerate is the most important, and when spread on adhesive plaster in such thickness as to obliterate the yellow color of the plaster cloth, when viewed through the light, it is the most effective cantharidal vesicant to be had.

PLASTERS.

This most ancient form of medication has largely fallen into disrepute during recent years, owing partly to their ineligibility and uncertainty of action, and partly to the advent of more efficacious and more quickly responsive methods of treatment. The advent of the rubber plasters has also caused the lay public, which believes in "anything that will stick," to appropriate the plasters as its own sovereign remedy for all kinds of aches and pains.

Nevertheless, the plasters serve a useful purpose owing to the great range of their application, which may be summarized in the following groups:

(1) *Epidermatic:* Supportive, protective, antiseptic, counter-irritant, vesicant. Vehicle: Rubber or any suitable adhesive.

(2) *Endermatic:* Anodyne, astringent, alterative, resolvent, sedative, stimulant. Vehicle: Oleates or lead plaster, sometimes with resins or gum-resins.

(3) *Diadermatic:* For constitutional or systemic effects. Vehicle: Lanolin or plaster-mull.

The vehicle for the commercial rubber plasters is chiefly india-rubber, or caoutchouc, with sufficient orris powder and sometimes gum-resins to give it the proper consistence and retain its adhesive properties. For epidermatic purposes this serves admirably as a convenient and fairly stable adhesive; but since it lacks penetrative properties in any considerable degree, it should not be used for endermatic effects, such as are sought from drugs like belladonna. The suggestion to increase the efficacy of rubber belladonna plaster by the addition of boric acid would seem also to support the view that such anhydrophile mixtures do not penetrate into the skin, as has also been clinically demonstrated.

For endermatic effects the oleates, as represented by the well-known lead plaster, are the best vehicle, since they penetrate into

but not through the skin, and thus have the desired effects without producing any systemic or constitutional results. The objection to the old-style plasters with a lead-plaster vehicle, that they are impaired by age, become brittle and lose adhesiveness, has been met by improved methods of manufacture, affording an adhesive plaster which retains its flexibility and through the admixture of a little rubber adheres without being artificially warmed.

For diadermatic or systemic effects the vehicle for plasters should be animal fat, such as lard or suet with waxes, or preferably mixtures of these with lanolin, substantially like the plaster-mulls of Unna. The official mercury plasters, at present made with lead plaster and gum resins, should be prepared with this lanolin vehicle.

OLEATES.

The official oleates are liquid or semi-solid mixtures of the respective oleates in oleic acid in excess, which renders them often ineligible. The true oleates, or so-called "dry oleates," are preferable, but these should be diluted with a proper vehicle before use.

As indicated above, the oleates do not penetrate through the skin, which becomes self-evident when the constant use of soap (sodium oleate) is considered. While there is plenty of evidence that the natural oleates, the oils of olive and almond, also the oleo-palmitates and stearates, lard, butter, etc., in which the respective acids are linked with the radical glyceryl, penetrate through the skin and are absorbed in the system, the artificial compounds of these acids with the metals and alkali bases, known respectively also as insoluble and soluble soaps, are not absorbed through external use. If it were otherwise, what an inducement for the people in "the farther Mediterranean" to consume at least some portion of their daily rations of olive oil in the form of soap!

LINIMENTS.

The value of liniments depends on the degree they penetrate into and through the skin, only one official liniment being protective, that of lime, the well-known Carron oil, so called from the factory town in England where the mixture of linseed oil and lime water originated as an application to burns. While the effects resultant from such liniments as consist of oils or soap solutions are supposed to be largely influenced by the mechanical rubbing or massage in

their application, solutions of medicinal agents, such as belladonna, camphor, etc., in alcohol or other volatile liquids, are no doubt more effective when they are applied by means of an occlusive dressing, as shown by the extended researches of Dr. Thos. F. Reilly,[1] presented to this association in 1900.

Several modifications have come into recent use: the saponimenta or liquid medicated soaps, which may be prepared extemporaneously from the official soap liniment or from the semi-solid form, linimentum saponatum camphoratum of the National Formulary or solid opodeldoc.

COLLODIONS.

The collodions, owing to the impervious film of pyroxylin or colloxylin which they leave on evaporation of the volatile solvent ether-alcohol, suggest a wider employment, and as being well adapted for applications on small areas, when lasting effects are desired of tannin, iodin, iodoform and similar derivatives. The official list may well be extended to include those of the National Formulary.

The linimenta exsiccantia, or the so-called drying liniments, have somewhat similar uses, except that they do not form so impervious a coating as do the collodions, the vehicle consisting of mucilages of starch, dextrin, tragacanth or albumin. The following is a type, which may be medicated as desired with zinc oxid, chrysarobin, iodoform, ammoniated mercury, ichthyol, salicylic acid, etc.

VERNICIUM ICHTHYOLI ALBUMINATUM, UNNA.

℞.	Ichthyol sulph. ammon.	ʒv	20
	Starch, powder	ʒv	20
	Distilled water	ʒxv	60
Mix with:			
	Liquid egg-albumin, recent	m. xii	75

MODERN DERMATOLOGIC PREPARATIONS.

Pastæ (*Pastes—Dermatologic—Lassar, Unna, etc.*).—These are mixtures of starch, dextrin, zinc oxid, sulfur or calcium carbonate, made into a paste with glycerin, soap or fat, such as petrolatum or lard, medicated with antiseptic or astringent agents. The following are important examples:

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[1] *The Journal A. M. A.*, Jan. 26, 1901, p. 250.

PASTA ZINCI, LASSAR (ZINC-SALICYL.).

℞.	Acid salicylic	gr. xxx	2
	Zinc oxid, starch, each	ʒvi	24
	Petrolatum, white	ʒxiiss	50

PASTA RESORCINI (MITIS), LASSAR.

℞.	Resorcin	ʒiiss	10
	Zinc oxid, starch, each	ʒvi	25
	Petrolatum, liquid	ʒx	40

PASTA NAPHTHOLI, LASSAR.

℞.	Naphthol	ʒiiss	10
	Sulfur, pp.	ʒxiiss	50
	Petrolatum		
	Soft soap, āā	ʒv	20

PASTA ZINCI MOLLIS, UNNA.

℞.	Zinc oxid, calc. carb. pp., each	ʒvi	24
	Mix these powders and incorporate gradually :		
	Lime liniment	ʒxiiss	50

PASTA ICHTHYOLI, UNNA.

℞.	Ichthyol, sulf. ammon.	ʒiiss	10
	Distilled water, glycerin, dextrin, each	℥i	30

PASTA ZINCI SULFURATA, UNNA.

℞.	Zinc oxid	℥ss	15
	Sulfur, pp.	ʒiiss	10
	Acid silicic (kaolin)	gr. lxxx	5
	Benzoated lard	ʒxviiss	70

PASTA DEXTRINATA.

℞.	Dextrin	ʒxxv	100
	Glycerin, distilled water, each	ʒxxv	100
	Dissolve by heat, add water to make 300 gm.	℥x	

This is a general vehicle for many medicated pastes used in dermatology.

PASTA KAOLINI. GLYCEROPLASMA KAOLINI.

℞.	Kaolin, elutriated and dried	ʒxiiss	50
	Glycerite boroglycerin	ʒiiss	10
	Methyl salicylate, thymol, each	gr. i	5
	Glycerin, to make	ʒxxv	100
	Or sufficient to make a semi-solid paste by thorough levigation.		

Stili (*Stili Dilubiles, Unna. Pencils*).—Pencils for the direct application to the skin of medicinal agents—antiseptics, astringents, anesthetics, etc. These agents are dissolved or mixed with a paste

consisting of mucilaginous or saccharin vehicles, starch, dextrin, tragacanth, sugar, etc., rolled out into sticks about $\frac{1}{8}$ inch (5 mm.) in diameter and 2 inches (5 cm.) in length, dried at ordinary temperature on parchment paper and wrapped in tin-foil.

Gelatinæ Glycerinatæ (*Glycerogelatin*).—Gelatin mass as a vehicle for suppositories and other external applications is used as follows:

GLYCEROGELATINA ACIDI SALICYLICI, 10 PER CENT., UNNA.

℞.	Gelatin	ʒiiss	10
	Glycerin	ʒxiss	45
	Distilled water	ʒix	35
	Acid salicylic	ʒiiss	10

GLYCEROGELATINA IODOFORMI, 10 PER CENT., UNNA.

℞.	Gelatin	gr. lxxx	5
	Glycerin	ʒv	20
	Distilled water	ʒxvi	65
	Iodoform	ʒiiss	10

GLYCEROGELATINA ZINCI DURA, UNNA.

℞.	Gelatin	ʒiiiss	15
	Distilled water	ʒix	35
	Glycerin	ʒvi	24

To this add gradually the following, levigated:

	Zinc oxid	ʒiiss	10
	Glycerin	ʒiiiss	15

Then mix it with enough water to make 100 grammes. The soft form (Glycerogelatina Zinci Mollis) is prepared in the same way by using 10 grammes gelatin.

These glycerogelatins should be freshly prepared when wanted. They may be run out in molds, oiled with cacao-fat. The zinc gelatins may be used as vehicles for ichthyol, resorcin, chrysarobin, etc. When to be applied, they are melted and then penciled on the affected part.

Gelatinæ Medicatæ (*Lamellæ. Eye Discs*).—Discs of gelatin are made with some glycerin, containing alkaloidal salts for insertion and solution in the eye. They are applied to the eye with a pencil. The following is an illustration:

GELATINA ATROPINÆ SULPHATIS. 1-10 mg.

℞.	Gelatin	ʒvi	25	
	Distilled water	ʒxxv	100	
	Glycerin	gtt. vi		4
	Atropin sulphate	gr. iss		1

For 1,000 discs from a plate 7 x 12 inches (18 x 30 cm.).

Salve Mull.—Under the name of "salbenmull," salve mulls, or steatines, ointments have been introduced of higher fusibilities spread on porous cloth, gauze or "mull" by Dr. Unna. These are mixtures of suet with lard and sometimes wax, in such proportion as to afford a consistence adapting them to being easily spread when heated without melting or running when applied to the body. They are intended chiefly for epidermatic effects, protective and antiseptic, but also for endermatic, astringent and resolvent action.

The mulls serve a distinct purpose in dermatology, since owing to the porous character of the fabric employed, they permit ready evaporation and thus prevent maceration of the epidermis, which usually occurs from the prolonged application of more occlusive dressings. Their value as a form of application in intractable skin diseases has therefore been recognized by the highest authorities in this special branch of medical practice. The following are some of the most largely used:

UNGUENTUM EXTENSUM HYDRARGYRI CHLORIDI CORROSIVI.
2 p. mill.

℞.	Mercuric chlorid	gr. iii	2
	Alcohol	m. lxxx	5

This solution is incorporated with the following mixture previously fused:

℞.	Benzoated lard	℈iv	5
	Benzoated suet	ʒxxiiss	90

UNGUENTUM EXTENSUM HYDRARGYRI CHLORIDI MITIS, 10 PER CENT.

℞.	Calomel	ʒiiss	10
	Benzoated lard	ʒv	20
	Benzoated suet	ʒxviiss	70

STERILE SOLUTIONS.

While many pharmacists are careful in making solutions, such as injections, eye washes, gargles, lotions, etc., the majority are not, and the result has been that many leading specialists in eye diseases, for example, prepare and dispense their own solutions, asserting that only through such procedure can they be assured of complete asepsis. The use of compressed tablets for hypodermic solutions has become general, chiefly because of their convenience and portability, but no doubt also from the fact that through their use solutions may be prepared extemporaneously with fresh water as pure as may be obtainable. In the larger cities where the water supply is more or less infected, the general practitioner no doubt is often compelled to use the service water instead of pure water, and

the employment of the tablets must therefore in many instances be a source of infection. Weak 1 per cent. water solutions of the alkaloidal salts: atropin, morphin, cocain, pilocarpin, also ergotin, permit germ growth, while concentrated solutions, *i. e.*, 10 per cent. solutions of cocain and quinin are easily kept germ- ree. Solutions in germicidal solvents: alcohol, ether, iodin, mercuric chlorid and strong phenol solutions, are not admissible, but almond oil may be used for camphor and glycerin for iodoform. Carbolic acid—1 drop for 160 minims (10 c.c.)—is the safest and altogether the best preservative for the water solutions.

Whether or not it may be regarded desirable to admit formulas for hypodermic injections into the U.S.P., there is no doubt that some general directions or formula should be introduced for sterilization. Not only for hypodermic injections are sterile solutions necessary, but also for ordinary injections, lotions or washes, nebulæ or sprays, and especially for collyria.

Dr. Fütterer, a most careful observer, reports several instances of the most serious results due to careless preparation of solutions for hypodermic use, and regards the official recognition of a process for sterilization as of the greatest importance, since it would enable the physician to specify its employment for the preparation of solutions, etc. It would, moreover, direct the attention of pharmacists to the necessity for care in these preparations and would afford him at once an authoritative method insuring the best results.

INJECTIONES HYPODERMICÆ, BR. PH. '98.

These solutions are prepared by dissolving the medicinal agent in distilled water which has just been boiled and allowed to cool. The antiseptic agents in the cocain and ergotin solutions are added before the medicinal agents are dissolved.

INJECTIO HYPODERMICA.

℞.	Apomorphin hydrochlorate	gr. iss		1
	Ac. hydrochloric dil.	min. iss		1
	Distilled water	min. clx	10	
℞.	Cocain hydrochlorate	gr. xvi	1	
	Ac. salicyl.	gr. 1/4		015
	Distilled water	min. clx	10	
℞.	Extract ergot	gr. clx	10	
	Phenol	gr. v		3
	Distilled water	℥ v	20	

℞. Morphin tartrate	. . . . .	gr. lxxx	5
Distilled water	. . . . .	℥xxv	100

The apomorphin and ergot injections are directed to be recently prepared.

ANTISEPTIC GAUZE.

Schimmelbusch, director of Bergmann's clinic in Berlin, states (1893) that moisture is one of the essentials for germ life, while "dryness" is one of its greatest enemies, and therefore dry dressing is always preferable to wet, except where the wound secretion is viscid and purulent and where the antiseptic material is employed for packing deep or incised wounds. It seems that the majority of surgeons prefer dry dressing for aseptic wounds, but wet or moist dressing for septic wounds, such as result from great laceration, etc. This question would go entirely beyond the scope of pharmaceutic discussion and is presented only to demonstrate the necessity for a distinction between wet and dry gauze and surgical dressings. While under the circumstances it may be inadvisable to recognize antiseptic gauze in the Pharmacopœia, the admission of aseptic gauze would be highly desirable, either simply defined as to its character and properties, as the "tela depurata" in the German Pharmacopœia and also "gossypium purificatum" in the U.S.P., or preferably by giving directions for the purification of the commercial gauze, as is done in the French codex by a process like the following:

CARBASUS ASEPTICUS.

Gauze of the required weight and mesh is boiled in water for ten to fifteen minutes, expressed, and washed two or three times in cold water. The expressed gauze is then allowed to macerate in solution of chlorinated soda for one-half hour, pressed and macerated in water containing 1 per cent. hydrochloric acid, rinsed in cold water several times, pressed, and dried in a closed vessel or sterilizer.

The gauze is quickly formed into rolls of the required dimensions and immediately transferred to sterile receptacles, preferably of tinned iron which are hermetically sealed.

PROGRESS IN PHARMACY.

A QUARTERLY REVIEW OF SOME OF THE MORE INTERESTING ADVANCES IN PHARMACY AND MATERIA MEDICA.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia.

That the rate of increase in the number of the newer remedies is not abating is evidenced by the number and variety of names that are published in each of the issues of the different pharmaceutical journals. Owing to this too bountiful supply of available material, it is difficult indeed to always select matter of permanent value. It is evident, therefore, that much of the data that finds its way into these reviews must necessarily be of a more or less ephemeral character; but even as such it has its value in illustrating the trend of the work on these new remedies. It will be remembered that several years ago inventive fancy, or ideas, appeared to concentrate on organic silver compounds; later they were concentrated on complicated preparations of arsenic, while at the present time quinine compounds appear to be in favor.

In a recent number of *American Medicine* a number of these newer quinine compounds are mentioned (*American Med.*, May 3, 1902, page 760), among them:

Aristochin, said to be diquinine carbonate, occurs as a white, almost tasteless powder, freely soluble in dilute hydrochloric acid, and is said to be qualitatively and quantitatively the equivalent of quinine hydrochlorate.

Chinaphenin, combination of quinine and phenetidin. According to the *Pharmaceutische Centralhalle*, 1903, p. 81, this is the quinine carbonic acid ester of phenetidin, and occurs as a light, white, tasteless powder, freely soluble in alcohol, ether, chloroform and dilute acids. Used as an antipyretic, analgesic and anti-neuralgic in doses of from 0·5 to 1·0 gramme.

Euquinine.—This, the carbonic ethylester of quinine, is also a white powder, almost insoluble in water, but easily dissolved in alcohol or ether. It has the same properties and may be given in the same doses as chinaphenin.

Saloquinine or salochinin has been noted in this journal (Amer. Jour. Pharm., 1902, p. 445). It is the salicylic acid ester of quinine, and is given in doses of from 1·00 to 2·00 grammes.

In addition to these, there are enumerated in recent numbers of German journals:

Aethylquinine.—This occurs as colorless crystals that melt at 116° to 117° Centigrade, free from bitter taste. Its uses and dose are the same as other salts of quinine (*Phar. Centralh.*, 1903, p. 151).

Bromochinal, the dibromsalicylate of quinine, occurs as yellow crystals that melt at a temperature of 197° to 198° Centigrade. Antipyretic and sedative dose from 0·50 to 0·75 gramme.

Sulfoguaiacin.—This is a name that has been given to quinine sulphoguiacolate. It occurs in the form of small, yellow, bitter scales, soluble in water and in alcohol (*Phar. Centralh.*, 1903, p. 79, from *Chem. Centbl.*).

Barium chloride, as a substitute for digitalis. Schaedel (*Ber. Klin. Wochenschr.*, 1903, p. 278) recommends chloride of barium as an efficient and reliable heart tonic. Given in doses of from 0·02 to 0·05, it is said to increase the blood pressure and to reduce the frequency of the heart's action.

Citarin, the anhydromethyl citrate of sodium, is supposed to be readily decomposed, liberating formaldehyde. It is also said to have a solvent action on uric acid and to increase the solvent properties of urine for uric acid and its compounds. Said to be useful in cases of gout and chronic rheumatism, given in doses of from 2·00 to 3·00 grammes four times a day (*Phar. Centralh.*, 1903).

Eukinase.—This is a yellow powder obtained from the duodenum of the pig. The preparation is to be administered in keratinized capsules as an aid to pancreatic digestion. Its active properties are said to be due to the enterokinase of Pawlow (*Phar. Centralh.*, 1903 p. 151).

Huckleberries (*Vaccinium myrtillus*) are recommended as a specific in cases of enteric fever by Bernstein and Drysdale (*Chem. and Drug.*, 1903, p. 203). They report having made tests with concentrated infusions of dried huckleberries, the results of which appear to indicate that these berries have some direct bactericidal action on the bacillus typhosus and also on the bacillus coli communis. The infusion of the berries is said to inhibit the growth and to eventually kill the organism in from twenty-four to forty-eight hours. Neither acids nor alkalies appear to have any effect on the efficiency of the active ingredients.

New urotropin is another trade name for anhydromethyl citric

acid hexamethylene tetramine. (See AMER. JOUR. PHARM., 1902, p. 603.)

Oxygen—Eugene C. Foster, M.S., in a recent number of the *Journal of the Franklin Institute* (May, 1903, p. 357), gives some account of the practical application of the suggestion, made by Prof. Raoul Pictet some years ago, that it was feasible to separate the constituent gases of liquid air by fractional distillation.

The problem of separating nitrogen from oxygen is by no means a simple one, the boiling points of the two substances differing but 12° Centigrade. The process is being developed, however, in a commercial way at the present time, it having been found possible to produce and market a 70 per cent. pure oxygen at a price no higher than asked for the ordinary commercial 50 per cent. gas.

Salicin, location of, in willow bark.—Mr. Daniel Brown, in a communication to the North British Branch of the Pharmaceutical Society of Great Britain (*Chem. and Drug.*, 1903, p. 651), gives the results of some experiments he has made to determine the location of the bulk of the salicin in willow bark (*Salix purpurea*). One lot of bark that contained a total of 5·8 per cent. of salicin contained 11·3 per cent. in the inner, 8·0 per cent. in the middle and 2·5 per cent. in the outer bark. Another series of experiments made by the same writer appeared to indicate the presence of a larger percentage of salicin in the spring than in the fall of the year.

Salocreol, a remedy for external application in cases of facial erysipelas, rheumatism, lymphadenitis and other affections of an inflammatory nature. It is said to be composed of the active ingredients of creosote and salicylic acid, and is a brown, oily, nearly odorless fluid, almost insoluble in water, but readily soluble in alcohol, ether and in chloroform (*Phar. Post*, 1903, p. 174).

Tests for Heroin.—F. Zernic (*Ber. der Phar. Gesells.*, 1903, p. 65) reviews the literature on the physical and chemical properties of heroin. In addition to a number of reactions that heroin has, that are similar to those given by morphine, it has been found that heroin has a specific and characteristic behavior towards nitric acid. If we add a few drops of 65 per cent. nitric acid to a trace of heroin, the latter is rapidly dissolved, producing a yellow solution that changes gradually, very rapidly if heated, to a greenish blue; this change appears to take place from the middle of the liquid. The color then gradually fades until the liquid has again changed to a

bright yellow. This reaction is said to be characteristic of heroin and is produced by the free base as well as the hydrochloride.

Theophylin or theocin.—Chevelier (*Les Nouv. Rem.*, 1903, p. 76) says that while the diuretic action of this preparation has been sufficiently demonstrated, its toxic action should not be lost sight of. The toxic dose of theocin for one kilo of animal weight has been demonstrated to be 0·10 gramme for a guinea pig intraperitoneal, and 0·20 gramme for a dog intravenous. Theocin is also said to have a marked effect on the heart.

Vanillin.—The formation of this substance is discussed by Lecomte (*Journal de Pharm. et de Chem.*, 1903, p. 343), who appears to hold that vanillin is formed in two distinct steps and by two ferments, one of which has hydrolizing while the other has oxidizing properties.

According to the theory proposed, the hydrolizing ferment decomposes the nascent coniferine into coniferylic alcohol and glucose; the coniferylic alcohol is then transformed into vanillin by the action of the oxidizing ferment.

Veronal, a new hypnotic, that is said to be diethyl-malonyl-urea and to equal sulfonal as a sudorific. It occurs as colorless crystals melting at about 191° C., having a slightly bitter taste, and being soluble in 12 parts of boiling water, or in 145 parts of cold water. For simple cases of insomnia doses of from 0·30 to 0·50 are said to be sufficient, preferably given dissolved in warm liquids. (*Apoth. Zeit.*, 1903, p. 195.)

Victorium.—Sir William Crookes has announced through the Royal Society that he has isolated a new element, to which he has given the name victorium. According to the description as given by Crookes, this new element is a light brown metal that is readily soluble in acids, has an atomic weight of 117 and is intermediate between yttrium and erbium. (*Süddeut. Apoth. Zeit.*, 1903, p. 234.)

Oil of Peppermint.—C. T. Bennett has discovered a new adulterant in a lot of oil of peppermint that did not appear to have any suspicious properties outside of not separating out menthol under the ordinary conditions. On careful examination of the separate constituents obtained by fractional distillation, Bennett found that the oil contained as much as 15 per cent. of triacetin. (*Chem. and Drug.*, 1903, p. 591.)

Nerol and Nerolidol are two new alcohols belonging to the gera-

niol series that have been isolated from oils of neroli and petitgrain by Van Soden and Zeitschl (*Chem. and Drug.*, 1903, p. 472).

Thymol.—Battandier (according to an abstract in the *Süddeut. Apoth. Zeit.*, 1903, p. 90) has found an oil of origanum in Algiers that contains a large proportion of thymol. The oil is obtained from several species of origanum, *O. floribundum* Munby, and *O. cinereum* Noé. Shaken with alkalies, the oil loses a fourth of its bulk. If a crystal of thymol is added to the oil, a compact mass separates out, leaving but a small quantity of mother liquor consisting largely of carvacrol.

Cod-liver Oil.—The tremendous increase in the price of this oil will, no doubt, lead to extensive adulterations with cheaper animal or fish oils, for which Von Wolff (*Phar. Zeitg.*, 1903, page 235) advises the nitric-acid test. To 15 drops of the suspected cod-liver oil add 3 drops of pure nitric acid; if pure, the oil will show a red streak at point of contact that rapidly changes to bright red, and later, after considerable shaking, to lemon yellow. Seal oil does not change at once, but on standing becomes brown. Other fish oils usually give a blue color, changing to brown, and, after prolonged standing, to a yellow color. The writer also lays much stress on the iodine and saponification numbers of the oil.

As an illustration of the reason for the great rise in price of cod-liver oil, it is said that the catch for March, 1902, was 4,700,000 cod, while for the same period in 1903 it was only 120,000.

Iodized Cod-liver Oil.—The *Apotheker Zeitung* (1903, page 252, from *Bull. de Phar. de Lyon*) suggests the following: Iodine, 1·00 gramme; chloroform, 2·00 grammes; cod-liver oil, to make 1,000·00 grammes. Dissolve the iodine in the chloroform, and add this solution to the cod-liver oil.

Aerated fixed oils are being advertised and used quite extensively in Germany. Among the oils that are offered as effervescent preparations, are: castor oil, cod-liver oil, olive oil and phosphorated oil. The contained carbonic acid gas is said to hide the taste of the oils very effectually, and at the same time to add materially to the keeping qualities of the different oils.

One of the *effervescing castor oils* is said to contain: castor oil, 75·00 grammes; expressed oil of almonds, 20·00 grammes; alcohol and aromatics, 5·00 grammes; mix and saturate with carbon dioxide gas, under pressure.

Phosphorated oil is said to keep almost indefinitely when saturated with carbonic acid gas.

Lofotal.—This is a trade-name for a cod-liver oil impregnated with carbon dioxide gas. The well-known disagreeable taste of cod-liver is entirely changed by the carbon dioxide, and the resulting preparation is said to be as pleasant as an aerated water. In addition to the improvement in the taste of the oil, aeration, it is claimed, will effectually prevent oxidation. (*Zeitschr. des All. Oest. Apoth. Ver.*, 1903, page 225.)

Castor oil in powder form may be obtained by emulsifying castor oil with skimmed milk, evaporating the mixture to dryness, and then powdering. This is said to be the composition and method of producing the proprietary article known as "Ricinus-Siccol." (*Phar. Post*, 1903, page 187.)

Persistent Hiccup.—For this annoying and at times even dangerous affection Dureillon (quoted by *Phar. Centralh.*, 1903, page 225) recommends the following simple remedy: Saturate a compress with a mixture of ether, 30.00 grammes; chloroform, 30.00 grammes; menthol, 4.00 grammes, and apply to neck.

Lanolin Cold Cream.—Lanolin, white vaseline, lanolin soap and rose water, equal parts, are mixed by dissolving the soap in the rose water, melting the vaseline and lanolin, and then adding the latter mixture to the former with constant stirring; stir until cool. (*Zeitschr. des All. Oest. Apoth. Ver.*, 1903, page 497.)

Menthol Emulsions.—Dr. de Chresantiques (*Klin. Ther. Wochenschr.*, through *Phar. Post*, 1903, page 174) gives a number of formulas for aqueous solutions of menthol. Of these the following three are fair illustrations:

	1	2	3
Menthol	0.03	0.15	0.20
Tincture of Quillaja	5.	10.	10.
Glycerin	10.		
Distilled Water	125.	150.	1,000.

Dissolve the menthol in the tincture of quillaja in the case of the first formula, add the glycerin, and finally the water.

The resulting mixtures are to be used as washes, mouth washes, or as cooling lotions.

Alum points may be prepared according to directions given in the *Pharmaceutische Zeitung* (1903, page 175), as follows: Add a few drops of water to powdered alum and heat in a porcelain dish over

an alcohol or gas flame to melt, then pour the melted alum into moulds of paraffine paper previously prepared. Combinations of alum and copper sulphate may be prepared in the same way.

For *copper sulphate points*, the same paper recommends the use of a finely powdered salt triturated with enough mucilage of gum arabic, or with simple syrup, so as to give the mass some plastic properties; this mass is then formed by hand into the desired shape and allowed to harden for several days.

Tincture of Iodine.—An alcoholic solution of iodine that is stable and not readily decomposed to hydriodic acid may be prepared as follows: Dissolve 1 part of iodine in 12 parts, by weight, of alcohol (90 per cent.), and then add 2 parts of powdered borax. (*Rev. des Nouv. Rem.*, 1903, page 151.)

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the fiftieth annual meeting, held at Philadelphia, Pa., September, 1902. Also the constitution, by-laws and roll of members. Baltimore, 1902.

This volume, containing, as it does, the account of the proceedings at the semi-centennial celebration of the American Pharmaceutical Association, has been anxiously awaited by nearly every member of the Association. It is probably the largest volume of proceedings that has been published by the Association, containing, as it does, a total of 1,266 pages of printed matter.

Considering the size of the volume, and the variety as well as importance of the contained material, the officers of the Association having the publication in charge are to be congratulated on the satisfactory way in which they have accomplished their task.

Six hundred and fifty-six pages are devoted to the recording of the minutes of the proceedings, including the texts of the papers that were contributed. This portion of the work has been reviewed quite extensively in this journal (see A. J. P., 1902, page 461 *et seq.*) and will need no further comment other than to say that the recorded pages evidence an active interest in matters pertaining to pharmacy on the part of the members of the Association.

The second portion of the book, "Report on the Progress of Pharmacy," takes up 434 pages of the book and constitutes one of the

most highly appreciated and most valuable features of the annual volumes of the proceedings.

The remaining portion of the book is made up, as on former occasions, of the constitution, by-laws and list of members.

This volume has, however, two additional features: a list of names of the members of the organization who have died, and also a collection of portraits of past and present officers of the Association. This latter feature could have been made more valuable if greater care had been exercised in the making of the electrotypes and the subsequent printing; as it is, the pictures do not compare favorably with the really artistic illustrations that accompany one of the contributed articles, that on "The Anatomy of the Stem of Derris Uliginosa, Benth.," by P. E. F. Perrédès.

One other very important feature, and one that should receive more attention in a book of this kind, is the index. For a book that to all intents and purposes is a work of reference rather than a book for casual reading, the index in this volume of the proceedings of the Association is decidedly disappointing.

This shortcoming will be the more appreciated when we realize that this large volume of 1,266 pages, more than 400 of which are devoted to a miscellaneous collection of abstracts, has but thirteen double-column pages devoted to the index. These index columns average about eighty titles each, making a total of 2,480 references, or less than two titles for each page in the book.

This deficiency in the index is well illustrated by the fact that not a single one of the names included under the obituaries in the report of the secretary of the Committee on Membership, is to be found in the index, so that any one not familiar with the volumes of the proceedings would look in vain for an obituary of Wm. S. Thompson, one of the best-known members of the Association, or of William Martindale, an honorary member, and one of the leaders in the pharmaceutical profession in England. Then, too, the different reports of committees, as well as the annual addresses of the President and the chairmen of the various sections, are woefully neglected as far as any attempt to index the various subdivisions of these respective communications is concerned.

It will, of course, be said that it is quite easy to find fault, but not so easy to suggest a suitable remedy. Appreciating this argument, the writer would like to offer several suggestions.

It should always be borne in mind that a volume of 1,000 or more pages represents a tremendous amount of work for the individuals directly responsible, particularly when, as in this case, the volume is expected complete within three or four months. This unnecessary stress of work could be done away with, and the proceedings made more available for the active members of the Association if the publication was more evenly distributed over the whole calendar year. For this purpose it has been repeatedly proposed to publish the proceedings in the form of a journal. This has met with objections, and many of the points of the objectors are well taken. There could be little or no objection, however, to issuing the proceedings, practically as they are published now, as a quarterly; of uneven size, it is true, but in quarterly installments.

The first installment would be due in June, and might contain the constitution, by-laws and the roll of members eligible for attending the next annual meeting; also such minutes of the council as have not been previously published. In addition to this, this issue might contain such miscellaneous information in reference to the annual meeting as might be available.

The second installment would be due in September, and might consist of the report on the progress of pharmacy. This would make this valuable feature available at a time when it is still comparatively fresh and interesting, being published from four to six months earlier than under present conditions.

The third installment, due in December, would contain the minutes of the annual meeting and the text of the communications presented.

The fourth installment, due in March of the following year, would contain the title-page, table of contents and an index that could fairly represent the contents of the respective volumes.

Such a quarterly publication would have several advantages. It would give the officers of the Association an opportunity of periodically communicating with the different members; it would make the proceedings more readily available to those members actively engaged in pharmacy; it would insure the publication of the report on progress of pharmacy six months, and the report of the proceedings three months sooner than at present, with less work and worry to the people directly responsible; and last, but not least, it would insure ample time for the compiling of an efficient and complete index to the contained material. M. I. WILBERT.

COURSE IN PHARMACEUTICAL ARITHMETIC, INCLUDING WEIGHTS AND MEASURES. By Julius William Sturmer, Ph.G., Professor of Pharmacy, Purdue University, Lafayette, Ind. 1903. Cloth, $1.50.

Too much stress cannot be laid upon the necessity for a certain amount of arithmetical skill on the part of pharmacists and students of pharmacy as well. Indeed, the pharmacist never puts up a prescription or makes a preparation without an exercise of the mathematical function, whether he be conscious of the fact or not. Moreover, the curricula in our colleges and schools of pharmacy presuppose a mathematical training on the part of the students, and where this has not been sufficiently thorough, there seems ample justification for the establishment of a course of instruction in pharmaceutical arithmetic. Indeed, this question would hardly seem to require any argument in the affirmative, since a mathematical training is essential in the study of the sciences which the student of pharmacy takes up, and particularly since no pharmacist can afford to be deficient in that branch of arithmetic which the author of the book at hand is pleased to term pharmaceutical.

Professor Sturmer does not aim to teach the principles of arithmetic, but to apply these principles to pharmaceutical calculations. His book seems to cover the field designated quite well, and will be of value to both students and pharmacists.

It may not be amiss to state that special attention is given to the meaning of percentage in prescription-work, weight-percentage, volume-percentage, and weight-to-volume-solutions being discussed in detail.

Another feature of the book to which it seems opportune to call attention, is that giving the rules for capitalizing the names of metric units. It is stated that usually the names of primary units and the larger secondary units are written with a capital, as Meter, Dekameter, Myriagramme, while the smaller secondary units are written with a small initial, as milligramme, decimeter, etc. These rules apply likewise to the abbreviations for these units, but in the U. S. Pharmacopœia all abbreviations of metric units are capitalized. It would seem that for the sake of making a yet nearer approach to uniformity, the Pharmacopœia should adopt the above rules.

F. Y.

OBITUARY.

FREDERICK BADEN BENGER.

F. Baden Benger, F.I.C., F.C.S., a member of the pharmaceutical manufacturing firm of Benger & Co., Ltd., and a highly esteemed member of the Pharmaceutical Society of Great Britain, died at his home in Manchester on January 28th.

Mr. Benger appears to have been a man of exceptional character and attainments, and, as stated by one of his friends, "rose to eminence in his calling and secured a position of affluence through the assiduous development of the scientific side of pharmacy."

Mr. Benger received his pharmaceutical education at Bloomsbury Square, passing his major examination in 1861. He then entered the employ of Messrs. John Bell & Co., in Oxford Street. The scientific trend of his mind soon manifested itself, and while in the employ of this firm he made a study of the possibilities of glycerin in pharmacy.[1] In 1866 he left Messrs. Bell & Co., and, together with Mr. Standen Paine, his surviving partner, took over the management of an old-established house in Manchester, noted for its chemicals and scientific instruments. Here he met Dr. William Roberts (afterwards Sir William Roberts), and in conjunction they carried on extensive researches on peptic digestion. It is said that this work helped to place Sir William Roberts in the Royal Society and in the front rank as a scientist. To Mr. Benger it brought both fame and profit, and may be said to have determined the subsequent part of his business career, for in 1891 he and his partner relinquished their interests in practical pharmacy to devote themselves exclusively to the manufacture of peptic and pancreatic products.

Mr. Benger was much interested in the educational side of pharmacy. He was a member of the Board of Examiners of the Pharmaceutical Society for thirteen years, and contributed of his means both for the educational and benevolent work of the Society. He also took an active interest in the work of the British Pharmaceutical Conference, of which organization he was president at Bath in 1888. In addition he was secretary of the Manchester Chemists' and Druggists' Association for many years, and also one of the hon orary apothecaries to the Manchester Royal Infirmary.

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[1] AM. JOUR. PHARM., Vol. xxxvii, 1865, p. 61.

Mr. Benger's attainments not only brought him honors in his own country, but gained for him a reputation abroad as well, and in 1893 the Philadelphia College of Pharmacy elected him a corresponding member. F. Y.

PHARMACEUTICAL MEETING.

The last of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for the session of 1902–03 was held on Tuesday afternoon, May 19th, Dr. C. A. Weidemann, Secretary of the College, acting as chairman.

The papers presented during the series of meetings just ended have been of special interest, and the discussions likewise have been profitable.

The attendance has been quite good throughout the year, and at the meeting on Tuesday the following members were present: Jacob M. Baer, Henry C. Blair, E. M. Boring, W. L. Cliffe, Jos. W. England, Wm. J. Jenks, Henry Kraemer, Chas. H. LaWall, Clement B. Lowe, Wm. McIntyre, Adolph W. Miller, Frank X. Moerk, O. W. Osterlund, Freeman P. Stroup, Herbert J. Watson, C. A. Weidemann, Thos. S. Wiegand, M. I. Wilbert and Florence Yaple. A number of visitors were also present.

Prof. F. X. Moerk presented the first paper on the programme, which was entitled "Simple Forms of Laboratory Apparatus." (See page 257.) The author described and exhibited some new devices for chemical analysis, including a hydrogen sulphide generator and another for the estimation of carbon dioxide in carbonates. These pieces of apparatus can be easily constructed by the student and are inexpensive. Among those taking part in the discussion of the paper were E. M. Boring, Wm. J. Jenks, Prof. C. B. Lowe and Professor Kraemer. The latter said that the hydrogen sulphide generator was an improvement in that it did away with the uncertainty of obtaining the gas, which was so frequently the case with the old form of generator; that the old form of apparatus for determining carbon dioxide was expensive and the results were unsatisfactory. Professor Kraemer also said that he thought that the readers of this JOURNAL would be glad to know of these devices which were of such simple construction. Professor Moerk stated that in the use of the hydrogen sulphide generator in his laboratory there was a saving of about 200 per cent. in material.

The next paper was a communication from Earl H. Cone, P.D., of Cincinnati, O., entitled "Salicylic Acid and Sodium Salicylate," and was read on behalf of the author by Prof. F. P. Stroup. The author presented clinical evidence to show the superiority of natural salicylic acid over the synthetic product. The paper was accompanied with a number of specimens and will be published in a later issue of this JOURNAL. Mr. Boring referred to the fact that the subject had been discussed at the last meeting of the American Pharmaceutical Association [Proc., 1902 (Vol. 50), pp. 378–393], and the consensus of opinion seemed to show that the three products, viz., methyl salicylas, oleum gaultheriæ and oleum betulæ volatile, were distinct, and the one should not be substituted for the other. In answer to a question of Dr. Weidemann, Mr. Wilbert said that at the German Hospital they employed annually about 150 pounds of synthetic salicylic acid, which is given in doses ranging from ·200 to 1·00 gramme, and that he had not known of any untoward effects from its use. Professor Lowe said that in his experience in the use of salicylates gastric disturbances were the most frequent. Professor La Wall remarked that if the natural salicylic acid was harmless, what could be the objection to its use as a food preservative. In reply to a question by Professor Kraemer, Professor Moerk said that several possible impurities might be present in the synthetic product and that these might arise from impurities in the phenol employed or from subsequent products produced in the course of oxidation of the phenol. Professor La Wall also remarked that the odor of phenol in salicylic acid might be due to the decomposition of the latter. Professor Moerk said that about four years ago he tested a number of specimens of salicylic acid from various sources and that none of them answered to the sulphuric acid test of the U.S.P.

M. I. Wilbert, Ph.M., presented "A Quarterly Review of Some of the More Interesting Advances in Pharmacy and Materia Medica." (See page 285.) The paper was discussed by Messrs. England, Boring, Weidemann, Moerk and Kraemer. Mr. England said that abroad it was one of the "bilberries" which was employed, and that this did not correspond to our "huckleberry," some kinds of which were yielded by Gaylussacias and not Vacciniums. Professor Kraemer alluded to the fact that the foreign literature seemed to point to *Vaccinium Myrtillus* L. as being the species used. Professor Moerk

referred to the fact that some years ago barium chloride had been found to be in the nature of a cardiac tonic (see National Dispensatory, fifth edition, 1894, p. 325).

Specimens of the following essential oils, received from Dodge & Olcott, New York City, were exhibited: Oil of fennel (chaff); oil of lemon; oil of bergamot; oil of caraway; oil of fennel (seed); anethol; oil of limes (expressed); oil of orange; oil of neroli; oil of coriander; oil of star-anise; oil of anise (Russian); anethol and carvol.

NOTES AND NEWS.

PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.—The druggists of Pennsylvania and their friends are making active preparations for the annual meeting of the State Association at Eaglesmere, June 23d, 24th and 25th. There is every prospect of a large meeting. Valuable reports on legislation are promised and unusually good papers are being prepared. A warm welcome is awaiting new members, and druggists from sister States will be heartily greeted.

Eaglesmere is a garden spot. There is a lovely lake in front of the hotel, and the scenic attractions are unsurpassed. For travelling arrangements write to J. A. Miller, Secretary, Harrisburg, Pa.

THE MASSACHUSETTS COLLEGE OF PHARMACY celebrated its semi-centennial on May 14, 1903, in connection with the graduating exercises. The annual banquet of the Alumni Association was taken in charge by the College, and President Wheeler presided. There were about 150 present, and the affair was very enjoyable. Ex-President Henry Canning acted as Toastmaster and the speakers were Mr. S. A. D. Sheppard, Prof. E. L. Patch, Mr. W. W. Bartlet, Prof. C. F. Nixon, Dr. J. T. O'Brien and Mr. A. Picken, president of the Class of 1903. At the commencement the degree of Doctor of Pharmacy was conferred for the first time.

THE AMERICAN CHEMICAL SOCIETY.—The Twenty-eighth General Meeting of the American Chemical Society will be held at Cleveland, Ohio, June 29 and 30, 1903. The opening session will be held at the rooms of the Associated Technical Clubs, 689 Arcade, at 9.30 A.M., Monday, June 29th. Prof. Edward W. Morley will give a brief address of welcome in behalf of the Cleveland Chemical Society, and there will be a reply by President John H. Long.

The Cleveland Chemical Society has charge of all local arrangements, and inquiries pertaining to such matters should be addressed to Prof. Hippolyte Gruener, 43 Knox Street, Cleveland, Ohio.

INVESTIGATION OF THE PURITY OF CHEMICALS.—At the suggestion of Prof. F. W. Clarke and others, a committee was appointed at the last meeting of the American Chemical Society to investigate the purity of chemicals, especially reagents, as sold by dealers. It is a common experience that many articles marked "pure," "chemically pure," or "C. P." are far from satisfactory, and it is believed by many analysts that the quality of reagent chemicals has grown

worse instead of better in the last few years. At any rate the matter is of such importance as to merit investigation. The committee, which consists of Charles Baskerville, L. M. Dennis, W. F. Hillebrand, H. P. Talbot and the president of the Society as chairman *ex officio*, is collecting data to show the extent of the evil of adulteration or wrong labeling, and requests information from all members of the Society who have had experience in the matter. This information should be sent to Prof. H. P. Talbot, Massachusetts Institute of Technology, Boston. The committee will be glad also to receive suggestions as to the best means of practically correcting the present unsatisfactory condition.—*Jour. Amer. Chem. Soc., May, 1903, p. 548.*

NEWSPAPER MISREPRESENTATION.—"The trade is tainted with fraud." Thus does the New York *Times* refer to the drug trade in commenting on Governer Odell's veto of the notorious Bostwick bill. And the *Medical Record*, to which the trade has a right to look for at least impartial criticism, says that the stand of the druggist against the bill is neither "judicious, convincing nor sincere," and bitterly refers to "flagrance of malpractice in pharmacy."

Words are insufficient to reply to such perversions of the truth. It is time that the trade resented the insults which, with increasing virulence, are being hurled at it day by day, not by words, but by deeds. The medical press depends for its very existence upon the support of the drug trade, and the daily press owes much of its prosperity to the same interests, and yet no slander, however vile, but is acceptable to the editors of both, provided only it be directed at the hapless retailer. The tune to which these men dance is played by practically the same hands, and they are hands to which the feel of the almighty dollar is everything—the practice of medicine, the practice of pharmacy, the good of humanity, nothing, despite their blatant sympathies in behalf of "the suffering patient." And side by side with malicious comment upon the druggist we find on every hand the press standing unanimous in condemning the Governor of Pennsylvania because of his approval of a bill which attempts to strangle the press in almost exactly the same manner in which the Bostwick bill would have strangled the druggist. It is an ideal example of the truth of the old adage, "Let the shoemaker stick to his last." The remedy for newspaper misrepresentation and slander is in the druggist's own hands. He should see to it that the editors of responsible newspapers are correctly informed regarding the real purpose of measures or movements affecting his interests.—*Editorial in Amer. Drug., 1893, p. 280.*

CHRISTIAN SCIENCE was struck another legal blow on May 4th, when the Supreme Court decided that the "First Church of Christ, Scientist," of Philadelphia, is not deserving of a charter. According to the *Public Ledger*, the opinion, written by Justice Potter, upholds the late Judge Arnold and former Judge Dimner Beeber, the referee to whom the application for a charter had been referred.

Judge Beeber reported adversely upon the application, mainly on the ground that the Christian Science doctrine that there were no maladies or contagious diseases was a menace to the health of the community.

Judge Arnold sustained this view, and went farther by saying that as teachers of the doctrine were required to sell Mrs. Eddy's book, the Church was an organization for profit.

Justice Potter, in his opinion, says:

"We are inclined to think that the evidence was not sufficient to support a finding that the corporation itself was to be one for profit. There was proof that the individual healers who are constituted and sent out by the society do receive compensation for their services, but this seems to be a personal recompense, with which the society has nothing to do.

"But the Court below, in its supplemental opinion, went beyond this question, and adopted in substance the conclusion of the master, that the practice of the art of healing or curing disease in the manner set forth in Mrs. Eddy's book is injurious to the community, because it is opposed to the general policy of the law of Pennsylvania relative to the existence and treatment of disease.

"It was the duty of the Court below to refuse the charter if in the exercise of sound legal discretion he found its purpose, in whole or part, included anything injurious to the community.

"Under the well-defined policy of the law of Pennsylvania, as at present existing, we are satisfied that there was no abuse of sound legal discretion in refusing the application for a charter."

U. S. PHARMACOPŒIA.—Prof. A. B. Prescott, as chairman of the Committee on Pharmacy and Queries of the Michigan State Pharmaceutical Association, says:

What is required of the profession of pharmacy is indicated and measured by the scope of the Pharmacopœia. This work is not the cause, but rather the consequence of advancement in pharmacy. It registers not the high-water mark of science alone, but the high average level of the utilization of science, the level of the drug business of the world. The Pharmacopœia is always in sore need of the latest and most exact of the determinations of science. In whatever country it has a place, it is made up of statements and definitions, some of which must have been made with hesitation, if not with fear and trembling.

The standards of the Pharmacopœia must follow rather than lead in the best practice for the production and supply of medicinal agents. No committee of revision dare say that they will admit into the Pharmacopœia just the best medicines and these alone. They will admit the medicines most used in the practice of the larger number of reputable physicians, as no committee of revision can require that medicines must be of this or that ideal standard in perfection of manufacture—regardless of existing limitations and the actual relations of cause and effect in the world at large. The term absolutely pure belongs to the language of the tyro and the boaster. If exact analyses were more widely made, precise limits of purity would be less freely declared. It takes a good deal of scientific work to cure the dogmatism of so-called scientific statements. The Pharmacopœia of 1900 will have to meet with a test severer than any applied to its predecessors, the test of the enforcement of its standards in the courts of law. Of this the committee of the present revision are surely aware, and for this, without doubt, they are making provision by the wisdom and conservatism of their policy.